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Investigation on Twins Concerning The Development of Self-Sufficiency in Children [1]

by

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I. The Purpose of The Investigation

When a human being is born, it is one of the most dependent of living organisms. Without painstaking care and nurture in his environment, the neonate would rapidly perish. Although one should guard against overestimating the degree of self-sufficiency attained by the adult, yet there exists a tremendous difference between him and the newborn infant. It is an extremely fascinating problem to study progressive maturation in self-sufficiency from childhood to adult life, which takes place at first in small degrees, later by leaps and bounds; to observe how the young person gradually becomes less and less dependent upon the help and supervision of others, how he relieves his fellow men of the burden of caring for him.

This study of the development of self-sufficiency is not only fascinating, it is also important. We cannot remain indifferent

1. Translated from: von Bracken, H. Untersuchungen an Zwillingen uber die Entwicklung der Selbststandigkeit im Kindesalter. **Archiv f. g. Ges. Psycholo., 1940, 105,** 217-242. (Ms. received August 4, 1939.)

2. Director of Research. From the Psychological Institute of the University of Bonn, Professor Dr. E. Rothacker, Director. A paper submitted in the fourth national professional contest of German students, sponsored by the Research Institute "The Study of Twins" of the medical faculty, the University of Bonn. The following medical students participated in the Research Institute: Herbert Claesgen, Hans Friedrichs, Ernst Haesecke, Gerd Heinemann, Egon Hermann, Erich Nicolay, August Peters, Erich Thelen.

3. The translator acknowledges assistance from Dr. Edgar A. Doll with special reference to the psychological and technique content. She regrets that interruption of mail service prevented obtaining the author's permission to publish this translation. It is hoped that the importance of making this article available to English readers will justify this liberty. Careful search has revealed no copyright restriction. The article plagiaristically follows Dr. Doll's work on the Vineland Social Maturity Scale (first published in 1935). It employs that scale in a study of twins closely paralleling a similar study from the Vineland Laboratory by Margaret Wilson conducted a year later but without mutual awareness. Miss Wilson's study (WILSON, MARGARET T. Mental Ages and Social Ages of Normal and Defective Twins and Siblings. **The American Journal of Mental Deficiency,** 45 (3): 374179, January, 1941. WILSON, MARGARET T. Social Competence of Normal and Defective Twins. **The American Journal of Orthopsychiatry,** 11 (2): 300-03, April, 1941.) has since been extended by the present translator. This translation is published to afford ready comparisons in these similar investigations.

to the nature and degree of self-sufficiency attained by the young people of our nation. This is particularly pertinent with regard to the problem of national welfare. Two examples confirm this point of view. In the first place: when one really studies the growth of self-sufficiency in a practical situation, one soon finds that the care of one's person plays a large part therein. To wash one's hands unassisted, to bathe oneself unassisted, to comb one's hair unassisted: all these are important milestones marking the development of self-sufficiency. It is unnecessary here to dwell further on the bearing of this aspect of self-sufficiency on national welfare. It is generally admitted that much of the prophylaxis of serious diseases depends on proper care of the body. It is also well-known that this law of preventive medicine is more abused in its neglect than its observance. A great deal remains to be accomplished here.

The second example: our Professor of Psychiatry, Dr. Pohlisch, here at Bonn, continually emphasizes in his clinical lectures that the most important eugenic problem in the control of feeble-mindedness is the borderline case. Moronity is more serious (e. g. in criminality) and more frequently inherently determined than idiocy (which is perhaps superficially more obvious). It is, however, not always so easy to distinguish the intellectually retarded from the normal. The current methods of determining feeble-mindedness are in some cases inadequate. In this connection the case of a gardener is instructive: he may not be very capable in matters of a verbal nature and may easily appear at least borderline by means of the current psychiatric tests. But this man is extremely able in his work; indeed, he has produced new species of plants. Is this man feeble-minded? By no means. It is not only a question of a different type of intelligence (much overestimated) but of competence in practical life.

Of course, among younger people it is not easy to determine much about this social competence. They have quite possibly had no opportunity as yet to accomplish anything outstanding. They are perhaps still attending school. But even the child has already had an opportunity to demonstrate his practical ability. Consider the development of self-sufficiency: a child who represents the average for his age group in this respect has already proved himself capable of shifting for himself to some extent. But among feeble-minded children it is to

be expected that in self-sufficiency they will fall behind their age groups. In the course of this study we shall disclose results which substantiate this expectation. It can therefore be assumed that a procedure which makes it possible to determine the degree of self-sufficiency among children and adolescents is of considerable medical and eugenic importance.

Here, then, is our problem. We desire to work out a procedure which affords degrees of measurement for establishing the level of a child's self-sufficiency.

At the same time we wish to determine whether the development of self-sufficiency depends solely upon education and environment, which might be readily assumed, or whether hereditary predispositions also play a part. To this end we wish to try out this as yet hypothetical procedure on identical and fraternal twins. If it happens that the identical pairs are more alike with respect to self-sufficiency than the fraternal pairs, then we can conclude, according to the principles of biological heredity in twins, that an hereditary condition is the predisposing factor.*

II. Our Twins

For our research we selected 21 pairs of twins of the same sex between the ages of 4 and 13 years. All measures which might result in an unrepresentative sample in the pairs of twins were avoided.

It might be argued that we should have examined all the twins of the age range in question living in a larger area. But for that one must have the means and much more time than a medical student can spare one or two semesters before the state examination. As a matter of fact, it would be quite incorrect to believe that only those studies are of any value which fulfill the above-mentioned condition. One cannot undertake a mass examination with a totally new and untried procedure. When one attempts it, so many new problems crop up that the experimental procedure must constantly be revised; and in all probability some portions of the results could not be utilized when it becomes apparent that these are characterized by serious failings. It is preferable to conduct "exploratory researches" before undertaking a mass examination. The results from such exploratory studies should be the basis for determining the desira-

* The work prepared for the national professional contest contained also another section which treated in a similar fashion the question of personal competence. But since personal competence presents much more serious problems, it seemed expedient to delay publication upon it until the work had reached a more advanced stage.

bility of employing the means and energy required by a mass examination. Our study is precisely such a tentative inquiry.

An outstanding and indispensable consideration in any study of the biological heredity of twins is the reliability of the method used in determining whether the twins are monozygotic or dizygotic; that is, identical or fraternal.

In this connection the physician thinks that perhaps he can utilize placental indications for that purpose. But when one is dealing with twins who are several years old this procedure presents considerable technical difficulties; in very many cases it is impossible to obtain information concerning the placenta. But even that is not the main consideration. In a not-too-small percentage of cases, the placenta is actually misleading.

What point of view, then, has been taken previously? Some determined whether one chorion or two were present. Twins with one chorion are contained in *one* "egg" (egg from the standpoint of the obstetrician), and for that reason they are monozygotic; twins with two chorions are contained in two "eggs" and are therefore dizygotic.

But now the studies of Lassen, Steiner, and von Verschuer have shown that this method is too simple. It would be legitimate if the embryonic division of identical twins were completed only in the later stages of embryonic development, and as a matter of fact after the differentiation of embryo and trophoblast had taken place. Unfortunately, however, not all twins oblige us by dividing so late. After all, why should the embryo not divide earlier? There is no plausible reason. As a result, a considerable portion of those twin pairs who are characterized as identical by their unmistakable and confusing resemblance to one another are born with *two* chorions. Therefore: the diagnosis of the placenta is perhaps simple, but impracticable and unreliable. We must search for another criterion.

Such a criterion, which has been considered over a long period of time and found useful, is the polysymptomatic diagnosis of resemblance, according to O. von Verschuer. The twin pairs were compared on the basis of various characteristics; unanimity of opinion was taken as an indication that the twins were identical; lack of agreement indicated the opposite. For this purpose all characteristics could be used provided that they are completely determined by heredity. But this assumption

is not valid for all characteristics; many of them are modified to a greater or lesser extent by environment. We must therefore select those symptoms of diagnostic resemblance which are most probably determined by heredity alone.

There are relatively few characteristics which completely fulfill this condition; of all these, blood grouping and blood factors belong in that category. But at this point we encounter another difficulty: the frequency of the various blood groups is so irregular among the German population that not only are identical twins of the same blood type, but also two-thirds of the fraternals. Different blood types, therefore, definitely establish the fact of dizygocity, but having the same blood type is by no means an indication that twins are identical. Therefore we cannot depend entirely on blood type but must also employ other characteristics, and indeed, if possible, must rely upon those which show a marked variability in Germany. And to this end we must depend upon characteristics which are one hundred percent hereditary. In that regard we find those characteristics particularly valuable which are determined by a number of hereditary factors rather than just one; in other words, polymeric characteristics are more valuable than monomeric ones. For example, the color of the iris and the shape of the nose are polymeric.

To these generalized conditions for the diagnosis of similarity we must add others, more specific, which are important for our experiment. Our subjects are children between the ages of 4 and 13 years. At these ages considerable difficulty is encountered in attempts to use fingerprints for our diagnostic purposes. We have had to dispense with this characteristic, which has frequently been used for a diagnosis of similarity; in its place we have substituted palmprints. Secondly, it occasionally happens that a blood test cannot be made. It was therefore necessary to take into consideration a very large number of characteristics which could be studied without such difficulties, in order to carry out a sufficiently reliable diagnosis even without blood type and blood factors.

These considerations suggest the following group of characteristics.

CHARACTERISTICS FOR DIAGNOSING SIMILARITY AMONG PAIRS OF TWIN CHILDREN

1. Height
2. Weight
3. Hair color
4. Hair form
5. Hairline
6. Facial form
7. Eyebrows
8. Eye color
9. Form of nose
10. Form of lips
11. Tongue fissures
12. Form of teeth
13. Position of teeth
14. Form of ears
15. Skin color (clothed portion of body)
16. Capillaries
17. Freckles
18. Palmprints
19. Fingerprints
20. Blood group
21. Blood factors

Other particulars

In almost every case we checked against the total number of characteristics listed above; only in comparatively few instances did one, two, or three characteristics have to be omitted. Moreover, all twin pairs were photographed in accordance with current anthropometric techniques; however, care was taken that the twins should not be photographed sitting, in order that the relationship of body size between the twin pairs might be more apparent. The pictures are especially valuable to illustrate differences in the form of face and ear.

The method of diagnosing similarity outlined above served very well. Not in a single case was the diagnosis of similarity according to the evidence from these several traits in the least doubtful. Frequently an unequivocal judgment could be made whether a pair was identical or fraternal.

In order to obtain a more complete picture of the developmental history and present status of each twin, a short anamnesis was compiled, including birth history, previous development, and family circumstances. In some cases, interesting observations were made during this part of the investigation, which were subsequently embodied in the questionnaire form.

III. BASIC PRINCIPLES OF OUR EXPERIMENTAL METHOD

When one wishes to determine a child's degree of self-sufficiency, the first question one asks will be: can I determine that in the child himself? Conceivably, the physiognomy of the child, the detail of his bearing and dress, are pertinent; but these are not exact enough. A second method would be to place

the child in a situation in which he would be called upon to demonstrate self-sufficiency. In other words, we could set up experiments to test self-sufficiency. But the experiences with the experimental study of related characteristics have not been encouraging; the overlapping between the results of various experiments on the same variables was very slight.*

A third method consists of systematically interviewing persons who know the twins, being a part of their environment, regarding maturation in self-sufficiency. Of course, in many circles people are unduly resistive to that sort of interrogation. The completion of questionnaires frequently involves disagreeable situations; it therefore happens that much devastating criticism is levelled at these unpopular questionnaires. Must this unpopularity be the decisive factor in our scientific study? No. It is not a question of popular judgment but of the scientific validity and relevancy of the method.

Moreover, even the scientific validity of the questionnaire is then by no means undisputed. But it is too often forgotten, in discussions of this subject, that interview techniques have been considerably improved in the last decades.* Questionnaires are not all alike; they are good and bad, suitable and unsuitable. Let us enumerate the faults which a questionnaire could have, and see whether we can design one which corresponds to our needs.

The mistake is often made of demanding more from a questionnaire than it can give. That is the case when, for example, a questionnaire is constructed for the purpose of eliciting a *profile* of the human being. Now a human being is not merely the sum of individual characteristics, but a configuration in which any individual characteristic has a particular weight which varies from person to person. A schematic arrangement of characteristics with the intention of determining whether one or another bears a stronger or weaker stamp, misses the mark completely.† In order to describe a person, in order to understand his individuality, an unconfined characteristic is necessary; a questionnaire can, at best, assist in the collection of data for this purpose.

We are not making the mistake of demanding too much of

* P. M. Symonds, Diagnosing Personality and Conduct. New York, 1931. S. 298 ff.
* P. E. Vernon, The Assesment of Psychological Qualities by Verbal Methods. Report No. 83 of the Industrial Health Research Board, London, 1938.
† H. E. von Bracken, The Understanding of Personality on the Basis of a Description of Personality. Langensalza, 1926.

our questionnaire when we use it for the purpose of getting information relative to individual characteristics. Of course we cannot learn about all characteristics; some belong to the realm of the spirit, which should not be touched with the rather blunt instrument of a questionnaire lest damage be done. But self-sufficiency does not belong in this category.

But is not self-sufficiency too *variable* an attribute to be encompassed in a questionnaire? For example: the little girl who sits quietly beside her mother in an otherwise unoccupied compartment on the train, who indeed wants to make little exploratory trips about by herself, runs at once to her mother if a strange man with a beard gets into the compartment. Depending upon the situation in which the child finds itself, self-sufficiency operates quite differently. Besides the external situation, the inner mood calls forth variable behavior. And finally, self-sufficiency varies with age, with development. At age 3 one generally cannot comb one's own hair or tie one's own shoelaces; at age 14 a lack of self-sufficiency in these respects would constitute a very unfavorable symptom.

Thus we see that self-sufficiency varies considerably according to developmental status, external situation, and internal state of mind. Can anything useful, then, be determined with regard to this attribute? At this point the questionnaire method is shown to its best advantage. If we had merely to ask how self-sufficient a child is, we would need no questionnaire; that could be accomplished more simply. We must, rather, gain an understanding of self-sufficiency in various situations and stages of development; and that can be done very readily with a questionnaire. Indeed, we could almost ask as many questions as we wished.

Of great importance here is the question of what to ask. It would for example be completely incorrect to describe any situation at all, and then request information from the mother as to *how* self-sufficient the child might be in that situation. How then shall the poor mother find an accurate gauge for judging the child's behavior? She knows her children perfectly, and perhaps knows several other children, although more superficially; but she lacks the most important basis necessary for an objective comparison. Even a teacher has great difficulty in this respect. As a matter of fact, a mother has to rear and care for her children, not judge them.

How, then, shall we proceed correctly? Let us take, for example, an instance of self-sufficiency with regard to personal hygiene: we ask whether the child washes his own hands, goes to bed at night unassisted, and bathes without assistance. In other words: we determine upon certain concrete situations and inquire about the actual behavior in those situations; we are not concerned with generalized estimations but with positive performances, which every mother knows in every case. In this way we avoid misunderstanding and circumvent a defect which characterizes so many questionnaires.

In pursuing this course we at the same time avoid a source of error which an experiment of this sort might have: it might be, for example, that a twin does not wash, comb, or bathe himself; let us assume that it happens when he is too tired, or when he is indisposed and would take too long to perform the function. Strangers find it difficult to grasp these exceptions and properly evaluate them; but the mother is well-informed and can give accurate information about them. The variability in behavior caused by changes of mood or attitude can be understood and accounted for by interviewing parents.

We have named another source of variation, namely, developmental status. In the age range of our twins, maturation is accomplished with a certain degree of regularity; from 4 to 13 years, as a rule, no such acceleration occurs as at 14, 16, or 18 years (puberty). As a matter of fact, age differences do not concern us very much: we wish to compare the two members of each pair of twins and they have the *same* age, being twins. But we are interested in the question of whether the children have attained a degree of self-sufficiency and personal competence corresponding approximately to life age. Besides, in interviewing the parents one must know at which age a particular performance in the category of self-help should appear, in order that one can be guided by it in explaining the items. It is also very important for the manner in which one speaks of these items. For example: in the course of the interview, if one gives the impression that a performance actually standardized at a higher age level should already be established in a child of a certain age, then the parents will be easily induced to make false statements, since they do not want the children to appear in an unfavorable light; or else they are prompted to

indulge in needless worrying. How shall we avoid this difficulty? How shall we learn at what age self-sufficiency is advanced by this or that development? Of great value to us has been the scale published in 1936 by E. A. Doll under the title "The Vineland Social Maturity Scale."* There are 117 items arranged by age levels from birth to age 25. To be sure, there are certain things about these items which bear criticism. Some are too general, particularly those which occur at the higher levels, namely "Inspires confidence," "Shares community responsibility," "Advances general welfare." Other items do not correspond to our conditions: very few German children, for example, have at age 11 had much opportunity to use a telephone. However, the German boy and girl are participating in adolescent group activities by the time they are 12 years old; and in Germany today one does not need to have attained age 15 to follow current events. We have therefore constructed a new serial arrangement of items. This was necessary also because we could not agree with the vague and somewhat one-sided concept of "social maturity," for the determination of which Doll's "Social Maturity Scale" was constructed. Strictly speaking, of course, we should have retested a large number of German children to determine whether our assignment of items was valid. It has not been possible for us to accomplish this to date; and for our purposes it would not make any difference since we are comparing children of the same age (twins); but before undertaking to use the method for practical purposes it will be absolutely necessary to undertake such a calibration. That we have not been too far wrong in our research will be evidenced in the discussions of the results.

Our principle, then, is to combine a large number of items which reflect simple, observable types of behavior. This principle has besides the already enumerated advantages another which is of great importance for our investigation. We wish to compare twin pairs. How shall the resultant differences be expressed? Merely to tally "concordant" and "discordant" pairs would be too rough a statistic; one should also be able to graduate the differences by degrees. This can be done perfectly by means of our questionnaire items. If the difference in self-sufficiency between the twins is slight, then perhaps there will be a difference of performance on only one item; if the

* E. A. Doll, The Measurement of Social Competence. Proc. 59 Sess. Amer. Ass. Mental Deficiency, Chicago 1935.

difference be larger, we will obtain differences on numerous items.

It must naturally be stressed that we are by no means measuring self-sufficiency exactly; were that the case, then every detail of our scale, i. e., each item, would have to possess psychologically the same weight. One might argue at length how great is the inequality in weighting of the several items. That such an inequality exists, cannot be doubted. Further, one might urge that we have selected only those items which can readily be expressed; it is certain that many a significant trait had to be discarded because it was difficult to make clear. Thus there are gaps in our scale.

We are in accord on this score: both of the alleged criticisms, that of the inequality in the psychological weighting of the items and the incompleteness of the scale, make it impossible for us to obtain exact quantitative measures with our questionnaire. On the other hand, we are undertaking to establish a far more accurate conception of self-sufficiency than would be possible by other methods. One could say, perhaps, that we are obtaining "quantitative scores" for the estimation of self-sufficiency. We do not overrate these scores but we regard them in the light of their origin.

Now that we have set forth the basic principles on which the questionnaire was constructed, we shall devote our attention to one final point: how shall the questionnaire be answered? We could give it to the parents to fill out and then call for it later. This we have not done. In the first place, many of the parents of our twins lived in an environment in which the use of pen and ink was uncommon, and in which there was no real understanding of printed or written matter. We have already spoken of the unpopularity of questionnaires. There is also the danger that the task of answering the questions will not be approached with the proper attitude. More important is the possibility that the questionnaire will not be filled out at all. The members of our professional organization therefore personally visited the parents of each twin pair, and they thoroughly discussed each item. In this way we avoided the afore-mentioned risks. The members had previously been trained for this purpose; we had discussed all the questions thoroughly, and we were all in accord as to what was relevant to the situation and what was not. One mother of twins graciously consented to answer the questions in the presence of the entire club; in

this manner the members learned the technique of interviewing by observing an actual interview, and learned how to meet any tendencies toward dissimulation, which sometimes occur in parents, without their being aware of it. It was stressed that the interview be conducted in the same manner by all eight members. If in this connection errors should have occurred in spite of our precautions, they would not have been considered critical: the main thing in our experiment was after all the comparison of twin pairs with one another. And both members of a pair were the subjects of the same interview by the same examiner.

Concerning the technique of interview, much might be said which lies in the realm of the obvious. Other less obvious and very important directions are difficult to formulate: these would deal with the question of tact and rapport in interviewing. But neither obvious nor yet abstruse is the fact that we did not take up the items by sequential arrangement on the scale, but according to category, for example: self-help in dressing and bathing; in eating; conduct in monetary affairs; locomotion; helping in the household. It was emphasized that in categorical examination the questioning should proceed in order from general to specific. The details were left to the judgment of each examiner; one person could establish rapport more successfully by this method, another by that.

IV. The Conduct of The Interview

The basic principles, which we developed in the previous section, shall now be applied to an investigation of self-sufficiency. In this regard we are in agreement that in the diagnosis of self-sufficiency it is a question of that which we defined in the beginning of our study: independence of help and supervision by others, relief of one's fellow men of caring for the developing citizen.

Our twins are from 4 to 13 years of age. The questions by means of which we wish to establish to what extent self-sufficiency has been developed must encompass a larger range: it is possible that a twin possesses a high degree of self-sufficiency for his age, or perhaps is considerably retarded. We have therefore constructed a series of items ranging from year 3 to 20. The questions are so arranged that a child is considered to be performing at a certain age level if all the items at that level can be answered positively for him.

To be concluded

Memories of Christmas Past and Present

Over a period of many years, a play given by the School Children has been one of the very enjoyable events of the Christmas season. In fact the idea of a play in which little children would have a real part in the Christmas festivities originated with the founder of the Training School, Professor S. Olin Garrison. He so truly believed in the necessity of providing happy occupation for children along with other living necessities that even when the physical size of the Training School was three buildings only and one of these, was what is now our Men's Club Room, there on a tiny stage the little children performed before an audience of twenty-five people. Those first Christmas plays were indeed real events in the life of the Training School.

Professor Garrison had many original and rather wonderful ideas about the celebration of Christmas and he never spared himself, in his tireless efforts to make it one of the most outstanding events of the year. (Some day I would like to tell you more about Christmas as it was celebrated in the Training School before automobiles, moving pictures and radios came into the picture and changed so many things which in those early days seemed so vital to the happiness of all who believed in Christmas.)

Fortunately for the Training School before Professor Garrison was called to his Eternal rest he had transferred into the keeping of his successor, our beloved Professor Johnstone, many of his most precious interests and one of these was the giving of a children's play at Christmas time and in testimony of how faithfully this trust has been carried out, the following record has been made. Namely, that in the 54 years in which the Training School has been privileged to celebrate Christmas, with three exceptions only, the children's play has been featured, as one of the very outstanding pleasures of the Christmas season.

At the close of the first World War in 1919 Professor Johnstone was called abroad to assist in Serbia with some of the

after war problems and I felt duly honored when in his assignment of special duties he gave into my keeping the responsibility of the "Children's Play" and I hardly need to remind my friends how proudly or of how seriously I accepted this task as they will remember how from early October when the search for a suitable play was started until the play was given and the curtain was lowered on the Grand Finale, I walked and talked and lived with the play.

Likewise, I hardly need to remind these same good friends of their surprises and pleasures when they enjoyed some of our ambitious undertakings—"The Other Wise Man" with Professor Nash playing the part of "Artaban," "The Poor Little Rich Girl," "Dickens Chirstmas Carol," "The Minatour" with the minatour going *happily* to his death. "Uncle Remus" with Deborah jumping over the footlights when the old owl flapped his wings and said "Who! Who! !" in her ear. "The Blue Bird of Happiness," with Mytyl and Tyltyl so sweet and the "Bread" agreeing with everyone, "Robin Hood" and many other fine plays. "The Sleeping City of Tic Toc," "Every Child," "The Return of Peter Grimm" all were delightful and long to be remembered Christmas Plays.

Due to causes all too well understood to need an explanation, 1942 was one of the exceptional years when a Christmas Play was not given, but in keeping with our needs and appropriate to the Chirstmas season a very delightful Sacred Concert was given in place of a play and was happily received by a very enthusiastic audience.

(The following is a copy of the program rendered and in which fifty-two children and four employes participated.)

SACRED CONCERT

Given December 30, 1942

PROGRAM

Selection	"It Came Upon the Midnight Clear"	Band
Cornet Solo	"Silent Night"	Charles A.
Recitation	"A Shepherd Tells the Story"	Bruce S.
Selection	"The First Noel"	Choir
Reading	"Christmas Here and There"	Marion P.
Selection	"O Little Town of Bethlehem"	Choristers

Selection	"Christmas Carols"	Instrumental Quartet
Recitation	"The Olden Story"	Carl G.
Pantomine	"O Holy Night"	Eight Senior Girls
	with Vocal Quartet and Piano Accompaniment	
Selection	"Away in a Manger"	Frank and James R.
Selection	"Jesu Bambino"	Girls Quartet and Senior Boys Chorus
Recitation	"A Christmas Prayer"	Florence R.
Selection	"And There Were Shepherds"	Choir
Reading	"The Christmas Message"	Ruth K.
Reading	"The Birthday of Our Savior"	Joseph C.
	with Incidental Music by our Band	
Recitation	"The Story"	Mabel H.
Solo	"The Star of Bethlehem"	Mrs. Ruth King Aker
	with Instrumental Quartet and Piano Accompaniment	
	The Children's "Good Night Song"	

A new set of scenery painted by Mr. Kelly during July and August, 1941 and 1942 was used for the first time for the Concert and while it was not designed for this occasion, a Temple Scene with its impressive pillar effects was a very fitting and lovely background for a program of dignified Christmas music. Mr. Kelly's chief work is the direction of the Band, but in addition to music he gives valuable assistance with the entertainment work and I am glad of this opportunity to give him due credit for the outstanding assistance which he has given me in the preparations of our Christmas plays.

Making a tin-woodsman walk and talk, giving heart to a scare-crow or awakening a city which has slept for a century are but interesting challenges to Mr. Kelly and I have yet to ask him to wave his music wand and say "Abacadabara" that he has failed to wave it and to produce one hundred percent results. Mr. Kelly is indeed a genius and likewise a very valuable member of the Educational Staff.

Alice M. Nash

Department of Agriculture Annual Report, 1942-1943

Henry E. Renne—Farm Supervisor
The Training School, Vineland, N. J.

It has always been the policy of The Training School to foster experiments in many fields of endeavor, not the least among these is agriculture. Because men from the State Experiment Station years ago were given every opportunity here to experiment with new fruits, insect and disease controls, and soil tests, much benefit has resulted to the field of agriculture in New Jersey and perhaps to the entire nation. Since it has been the desire of our department to continue to follow along these lines, most emphasis in the report this year will be placed on the tests and experiments we have conducted with fruit and vegetable crops.

Before touching upon this, however, we should mention that 1942 was a wonderful year, for nearly all crops yielded better than in 1941. Also never before has the institution been so amply supplied with poultry so that just when other meats became unavailable, there was plenty of chicken to be had. More details concerning this branch of our department will be given later in the report.

The experiments and tests we have carried on during the year have included the following: (1) a lime and fertilizer test under asparagus, (2) a fertilizer test for potash under white potatoes, (3) trying a new spray material called Cuprocide in comparison with Bordeaux Mixture, (4) changing the method of applying fertilizer under tomatoes and watermelons, (5) applying fertilizer on the orchards in the fall instead of the spring, (6) testing New Jersey hybrid field corn on this type of soil, (7) resting land one year (under the supervision of the State Experiment Station at New Brunswick), and (8) the conserving of leaves for humus.

On March ninth, a new asparagus bed was planted. After the rows were plowed out a mixture of superphosphate, raw bone meal, and ground limestone at the rate of 1500 lbs. per acre

were sown down the rows. A small hand harrow was used to mix this with the soil in the bottom of the furrow and the roots were placed on top of this mixture. As the new plants began to grow, fertilizer was distributed along the side of each row. By August these plants on the whole were as large as most plants are at two years old or over. Some of them, if taken by the tip and held up straight, would have measured 5½ to 6 feet. One row which did not have this treatment was only about one-half as large. We have high hopes of securing some wonderful asparagus from this field in years to come.

For years white potatoes have been grown with fertilizer containing only 5 to 7 percent of potash. For some time we have felt that the use of more potash would increase the yield and so, with this in mind, a half acre was planted using fertilizer containing 5 percent potash and a half acre using 10 percent potash. The fields were adjoining so there was no appreciable difference in the soil. Each field was cultivated and sprayed the same number of times. When the crop was harvested the field with 10 percent potash yielded 24 baskets more than the other. This was much more than enough to pay for the extra cost of the increased potash.

Cuprocide, a new fungicidal spry developed by a chemical company in the east, which contains no lime but another material for a neutralizer, was used this year on vegetables in comparison with Bordeaux Mixture. Bordeaux consists of a mixture of lime and copper sulphate in water and had been used for years with good success. Cuprocide is advertised as being able to do a better job than Bordeaux because it goes into solution better and the materials are broken down finer, thus making a better spray. Since it comes prepared in small packages, there is no mixing to be done as is the case with Bordeaux. Cuprocide was used with success on all our vegetable crops this year and although we did not see a noticeable difference in its disease-destroying powers from Bordeaux, we plan to give it another trial next year for it seems to have excellent possibilities.

Two weeks before the early tomatoes were set this year, fertilizer at the rate of 750 lbs. per acre had been sown down the rows. The fertilizer was applied with a potato planter which places the material in bands on each side of the row. As May was a very dry month, it was feared there might be some danger

due to the fertilizer burning the roots of the young plants, but such was not the case. When more rain did come they made an excellent growth. The plants seemed to withstand the dry weather better and were hardier in every way. The fruits were consistently larger than on those plants under which fertilizer was broadcast at the same rate per acre.

The same method of fertilization was used on watermelons with equal success. The melons were larger than those on which the fertilizer had been broadcast, but there was an excess of vine growth which would have been detrimental had the season been exceedingly wet. Nevertheless, we conclude that this practice would generally pay because it is not often that we have too much rain.

Both peach and apple orchards had fertilizer applied in the fall of 1941 rather than in the spring of 1942. Even though there was a tremendous fruit crop, we do not attribute it to the fertilizer entirely. The general good size of the fruit in spite of the large production we do attribute to the applying of fertilizer in the fall for it is certain that the fertilizer had more time to get down to the tree roots.

Much has been said during the year about hybrid field corn. The 80.6 bu. per acre harvested from the Main Road and Chestnut Avenue field certainly proves without a doubt that New Jersey has a hybrid corn that is second to none for our soil and climate. Credit goes to the men at the Experiment Station for their splendid work in developing this seed.

Some of our far-seeing men at New Brunswick have felt for some time that farm land should be rested one year in six or seven. In order that they may prove their point they are conducting experiments throughout our state. One such experiment is being carried on here in the field adjoining Spring Road and Chestnut Avenue where last year sweet corn was grown. A small tract of land has been permitted to lie idle for one entire year and will be planted to a cash crop next season. An accurate record will be kept in order to determine whether or not the increase in yield is enough to pay for the loss of the use of the land for one year. The amounts of corn harvested on both sides of the tract were recorded this year so that this comparison will be fair in every way. A total of 19,640 ears were harvested on the 2½ acres adjoining the tract.

A wire enclosure approximately twenty feet square was erected this fall in which to store fallen leaves for humus. Lime will be applied to these during the decaying process so that there will not be an excess acidity in the rotted material. Realizing that our fields are fast becoming depleted of humus because there is not enough stable manure to enrich them, it is felt that this practice will be one way to replace it in small degree. If the humus is kept in the soil, it becomes more porous and flaky and does not tend to be hard and lifeless. The luxuriant growths produced by artificial fertilizers deplete humus of its necessary elements unless organic manure is used to restore them. When we realize that it takes thousands of years to build one foot of top soil, it is brought home to us very clearly that we must make strenuous efforts to restore the humus as we go along so that our top soil will not be washed away into ditches and gullies.

We mentioned in the beginning of our report that the institution has been well supplied with poultry. This was possible because 6,150 birds were reared during the year. Of this number, 2,000 have been selected for laying hens and these have furnished the school with as many as 900 eggs a day. Chickens have been killed regularly almost every week so that as much as 800 lbs. of meat a week have been dressed at times.

It has been possible to produce and harvest double the quantity of some foods for canning this year over last year because nearly forty boys are scheduled to the farm daily. Many of the younger boys are fast growing up and are adapting themselves to the outside work exceptionally well.

The sudden death of Mr. Orrie O'Hara last spring was a great shock to all of us. We were most fortunate, however, in being able to replace him with Mr. Nino M. Colla, Jr., who has fitted into our activities exceptionally well. This fall, Mr. James Wasson, who had been with us for nearly two years, left to begin training in the army air corps. It may be necessary that we carry on with fewer men for the duration of the war.

The department made a special effort on the Fourth of July to decorate a float for the parade with a large V for Victory made entirely of fruits and vegetables grown on the farm. Several of the boys had a share in helping produce this, one of the finest displays we have had.

Because of the splendid work of our farm boys, it was felt that they should be rewarded in some way for their faithfulness. One evening in September over sixty boys gathered in Garrison Hall to play games, sing songs, listen to good music, and enjoy refreshments.

The boys and the farm personnel have both responded loyally this year in our efforts to produce a greater amount of food. With rationing on every hand, it becomes evident that our farm is now a very important part of our institution, perhaps more so than ever before. The time is apparently coming when many foods will be very scarce, or entirely unobtainable. Though we may not be able to replace some of the items disappearing from our tables, at least we shall have a properly balanced diet with plenty of vegetables, fruit, and fowl. As Mr. George Bransby Williams, a man interested in agriculture, has said, "The production of home produce has been in normal times an economic question, but in wartime it has become a vital matter on which the survival of the nation may depend."

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For a long time the Robison boys were telling their friends that on New Year's they would be invited to a "real blow-out." (Just what that indicated was a little obscure.) Finally, the time arrived and a finer party it would be hard to imagine. A group of play-loving, active boys were filled to the brim with the spirit of fun, but conscious of the dignity imposed upon them in entertaining their friends and making a good stand for their cottage. Every boy was proud to be one of the group as well he might be. They played lots of stunt games, and everybody showed his ability to give and take and to play the game well—then more quiet games and some social groups just visiting—and finally refreshments—daintily and generously prepared by Miss Meiser and Mr. Leslie and served by the boys. The leisurely, comfortable manner of this group (not always easy to find in a large group of adolescent boys) reflects cooperation, good spirit and good training. As a guest, I felt after this happy evening, and I saw the boys assemble one by one for the "Goodnight Song" that through the growing years of these boys happiness has come first, and in each boyish heart is the spirit of devotion and service.